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ABSTRACT

This manual outlines a general procedure for deciding whether or not a multimedia package should be adapted or repackaged to meet local needs, reviews both general and specific factors to be considered in repackaging materials, describes the process of repackaging, and outlines procedures for the try-out, evaluation, and renewal of repackaged material. Aids for the user include a 10-item checklist identifying key issues to be considered in the initial decision as to whether to repackage, and an application of this procedure to a social studies package for grade 2; discussions of such general factors as the situation, special problems of disadvantaged learners, personal characteristics of teachers, financial limitation on resources, and professional support services; and a review of specific factors concerned with objectives and content, media selection, production, utilization, and distribution and evaluation. Guidelines for the process of repackaging include a checklist for the diagnosis of changes needed, a specifications table for repackaging, a table showing potential media substitutions, production hints, and a production plan. (LMM)

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APEID

Asian Programme of
Educational Innovation for Development

Guidelines for Repackaging Multi-Media Resources

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The guidelines for the repackaging of multi-media resources, were prepared by an APEID Task Force which met in Bangkok from 24 to 27 May 1982.

The Task Force examined the educational advantages of multi-media packages, the factors that have to be taken into account when repackaging such media resources and made suggestions regarding the procedure that has to be followed when repackaging.

The Task Force consisted of Dr. Rex Meyer as Chairman and Dr. Pruang Kumut and Dr. Pisarn Soydhurum as members.

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Chapter I

INTRODUCTION

Multi-media packages are now widely used in educational systems throughout the world and especially in Asia and the Pacific. A multi-media package brings together into one kit various print and non-print educational media into an overall learning system. Such a system has clearly defined educational objectives and learning activities. The content of the package is conveyed through various media of communication such as printed materials, audio-taped programmes, still and moving pictures and real or simulated objects. These resources are frequently co-ordinated by a teacher's guide and there is usually a work book or study sheets for the learner. Most multi-media packages are designed for a specific topic or topics of a given curriculum and so have some features in common with self contained modules.

Relationships between these various concepts are shown in Figure 1.[1]

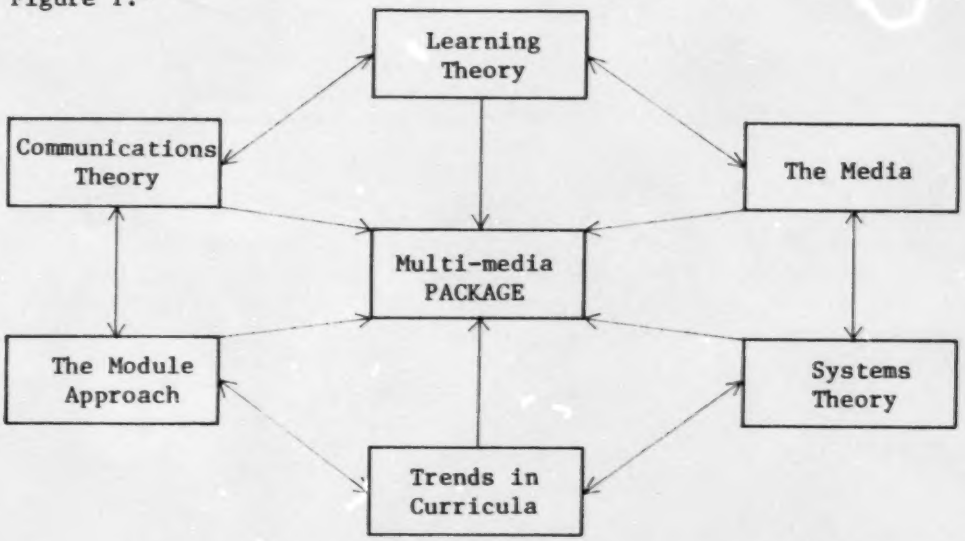

Figure 1. Relationships between concepts influencing multi-media packaging

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1. Meyer, G. Rex "Modern science curricula implemented through the multi-media approach" *Australian Science Teachers Journal* Vol. 18, No. 4, December 1972, pp. 51-58.

Multi-media packages may be very simple. A set of printed notes accompanied by a workbook with a set of instructions on audio-tape is a multi-media package. Some packages may be very complicated containing a wide variety of print and non-print resources. A package on, say, the animals of a given region, may contain a teacher's guide, pamphlets, sets of study prints, sets of colour slides, flash-cards, audio-taped commentaries, plastic models of animals, modelling clay, colouring books and activity sheets for the learner. Such packages may or may not include the "hardware" needed for group viewing or listening, perhaps low-cost slide projectors or tape players. The more complicated multi-media packages are usually placed in a specially designed container or box to facilitate transportation, storage and use in the classroom.

Some multi-media packages are designed so that no single element or item within the package could be used on its own. In such a case, each item only "makes sense" when used in combination with other items in the package. A set of slides which could not be interpreted without the audio-commentary provided on an accompanying cassette tape would be an example. Other packages are more flexible with most items designed for use in combination or separately. In the least flexible multi-media packages learning activities are usually specified in considerable detail with little opportunity for variation or amendment by the teacher or learner. In more flexible packages there is greater opportunity to use items independently, to combine them in various ways to meet a wider range of objectives, and to work out original activities to achieve these objectives.

On first inspection, a particular multi-media package may not appear to meet the needs of a particular educational system or be practicable or feasible for wide scale use by that system. For example, a certain package may meet the exact needs of a particular course of studies but contain items such as video-tapes that could not be used because few schools have tape players and monitors. As a further example a package may consist entirely of simple, low-cost items such as slides and printed materials, but have objectives and activities which do not quite meet the requirements of the local curriculum.

Multi-media packages, have very considerable educational advantages. They enhance learning by encouraging use of several senses and promote active involvement in meaningful learning activities. The development of multi-media packages from first principles however is both time-consuming and costly. There is a strong case for adapting existing packages to meet local needs and circumstances. In the examples given above, the package containing video materials could be modified by substituting, say, slide-tape

sequences or even more simply, illustrated printed texts in the form of booklets or pamphlets could be used. The package containing low-cost media but with objectives not quite relevant to the local syllabus, could perhaps be changed by some restatement of the objectives plus minor amendments to some items within the package.

If the degree of adaptation is too great, however, it may be best to start from first principles and develop an original package.

The procedure for the redevelopment of each specific item or part are the same as for any other educational resource, except that each modified item must be designed and produced as part of an integrated complementary system. The relationships between each modified part and all other parts of the package must be carefully considered. Change in one item almost always necessitates changes in almost all if not all other items in the packet.

The overall procedure for repackaging is summarized in Figure 2.

An educational need arises and it is recognized that a multi-media package would most likely meet that need. An example would be the introduction of a new social science programme for which there are few resources in the schools. The packages available, however, do not quite meet the requirements of the curriculum. The best of the available packages is selected for repackaging. After redevelopment and trialling the new package is implemented. At that stage continual evaluation gives evidence for the need to make minor adjustments or modifications throughout the useful 'life' of the package. Alternatively major changes in the system may occur such as syllabus revision or the introduction of a new medium. This means new needs have arisen which may necessitate a major change involving development of a new edition of the package.

The following guidelines set out a rationale and procedure for making decisions about repackaging and describe in a general way the steps to be followed.

IS REPACKAGING NECESSARY?

In considering whether or not some degree of adaptation or repackaging is required for a given multi-media package, two initial questions need to be considered:

A. Does the package meet needs?

B. Is the package feasible for the existing educational system?

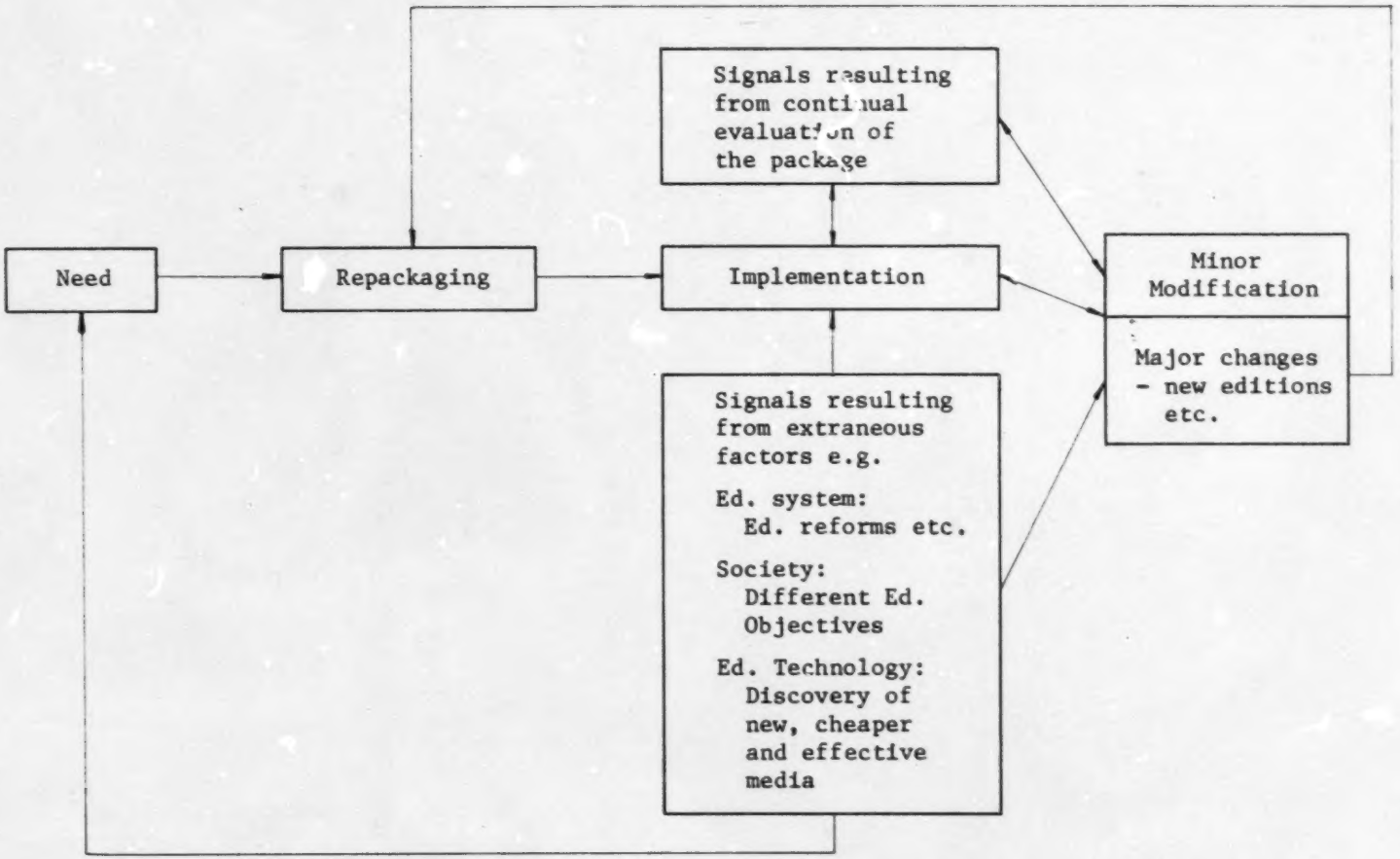
Signals resulting from continual evaluation of the package
Need
Repackaging
Implementation
Minor Modification
Major changes - new editions etc.
Signals resulting from extraneous factors e.g.
Ed. system: Ed. reforms etc.
Society: Different Ed. Objectives
Ed. Technology: Discovery of new, cheaper and effective media

Figure 2. The procedure of repackaging

Answers to these questions determine general policy. Four alternatives are possible. The package may be:-

1. adopted in its present form;

2. adopted after some minor adaptations and repackaging;

3. used as a guide for the development of a totally new package covering the same or similar subject matter;

4. rejected as unsuitable in either its original or repackaged format or as a model for a new package.

The following checklist identifies ten key issues to be considered in this initial decision.

A.	Does the package meet needs?
1.	Does it meet national, regional and local needs?
2.	Does it contribute to the objectives of the curriculum?
3.	Is it up-to-date in terms of content and syllabus requirements?
4.	Does it employ media appropriate for the needs and objectives of the curriculum?
B.	Is the package feasible for the existing educational system?
5.	Can the package be used with presently available resources, materials and physical facilities?
6.	Is the cost of purchase or repackaging within the budget available?
7.	Could the package be effectively used by all types of teachers for whom it is intended?
8.	Could it be effectively distributed to all types of schools?
9.	Does it allow for the specific learning difficulties of the learners?

10. Is it generally appropriate for this educational system?

An example of this procedure is given below.

Example: A social studies package for grade II produced in one of the countries of central Asia. Now being considered for a rural education programme in a tropical country of South-East Asia.

The package consists of a teacher's guide; sets of large study prints; an audio-taped commentary and sets of pupil activity sheets.

The package is reviewed by the social studies curriculum panel who find the following:

1. General principles of health, nutrition and family planning developed in the package are immediately relevant to national and regional needs but may need some change to accommodate certain local attitudes and values.

2. The objectives of the package are geared somewhat to the situation in central Asia.

3. The content is up-to-date but the examples illustrated in the study prints do not meet the specific requirements of the local syllabus.

4. All media used in the package would be familiar to the relevant pupils and are appropriate for the messages they convey.

5. The package could be generally used with presently available resources and facilities. Some additional audio-equipment may be needed in certain rural areas.

6. The cost of reproducing the package is within the budget available.

7. Some teacher education may be needed for teachers with only two years' training to ensure effective use of the audio-taped commentary. Most teachers, however, could use the package effectively without further instruction.

8. The package is light-weight and compact and could be effectively distributed through the usual channels.

9. The language is too complex for the pupils and would need to be simplified.

10. The general scope and content is appropriate for the educational system but certain specific examples, especially in the study prints, are culturally biased towards central Asia and would need to be replaced by local examples.

Decision: to use the package after a degree of redevelopment

i. Objectives to be slightly revised

ii. Certain study prints to be revised using local examples

iii. The audio-commentary to be simplified and given greater local relevance

iv. The teachers' guide and pupil activity sheets to be revised.

This is a relatively simple, clear-cut example. A great many other factors may need to be considered. The next section reviews some of these factors. Guidelines are then provided on the actual process of repackaging and a last section discusses certain aspects of trying-out, evaluating and renewing repackaged materials.

Chapter II

FACTORS TO CONSIDER

The first chapter outlined a general procedure for deciding whether or not a multi-media package should be adapted or repackaged. It was stressed, however, that the decision is really more complex than suggested there and that numerous factors could, in practice, influence the decision. This chapter reviews some of these factors.

A. General factors

There is a number of general factors to be considered in repackaging materials. These include (1) situational factors, (2) special problems of disadvantaged learners, (3) personal characteristics of teachers, (4) financial limitations and (5) professional support services.

1. Situation factors

There are several situational factors to be considered in repackaging materials. These include (1) materials suited to populations in remote rural areas in contrast to populations in urban areas, (2) materials suited to the needs of disadvantaged groups of the population and (3) materials catering for different learning difficulties.

Populations in remote rural areas, by and large lack accessibility. There are great transport difficulties in some of these areas, and some have not yet opened up. This leads to isolation of the local people from the mainstream of the population. Materials to be used for people living in urban areas may not be applicable to these more isolated populations. Distance teaching materials may be more feasible for these remote groups.

Packages used for general education purposes in schools may not be suitable for training teachers without some form of repackaging. Conversely, packages used for the in-service education of teachers may not be applicable for general education programmes in schools.

2. Special problems of disadvantaged learners

Materials used for normal groups of learners may not be suited to certain disadvantaged groups such as: (1) culturally deprived minorities, (2) hill tribes, (3) physically handicapped, mentally retarded, and the deaf, dumb and blind, and (4) urban slum dwellers. Packages may need to be readjusted to meet the learning needs of such groups.

In some of these cases the repackaging may only require minor amendments to the materials. In some cases, however, revisions may have to be very extensive. Learners with sensory deficiencies are especially important in this regard and packages designed for them may need various media replaced or specially developed. Examples could include large print materials for the partially sighted and specialized audio programmes for these with hearing difficulties.

3. Personal characteristics of teachers

Characteristics of the teaching force in one country are different from those in other countries. The kinds of training given in certain countries of the Pacific region for example would be different from countries in the Asian region. If packages are suitable only for the conditions in certain particular countries, they would need to be repackaged for use elsewhere.

Individual teachers of a given country have different backgrounds, interests, knowledge, skills and preferences. If the packages available at present do not suit the background and teaching style of an individual teacher, he or she may wish to make some minor amendments to the packages.

4. Financial limitation on resources

There are certain communities where access to resources is relatively easy. There are, however, certain other communities where the school plant is highly inadequate and even basic facilities such as blackboards and chalk, and reading and writing materials are not always available.

There is also a problem of supply of learning materials for students. Textbooks are perhaps the only material available and even these do not always reach schools in time. Alternative strategies in tackling some of these constraints would be through use of radio and provision of distance teaching programmes. Multimedia packages would need to be modified to meet these needs.

5. Professional support services

The degree of repackaging which can be achieved depends to a certain degree on the professional resources available. Utilization of existing resources such as community learning resource centres and in-service training facilities of schools can help make repackaging more effective. Opportunities to visit other institutions would also help teachers to produce materials of high quality.

B. Specific factors

The selection and use of any educational resource is influenced by a great many more specific factors. Certain of these are of special significance for the repackaging of multi-media materials. The following tables list some of these factors and provide brief comments on their implications for repackaging.

These tables could be used as a checklist of specific factors or issues to be taken into consideration when deciding whether or not to repackage or for determining the extent of the changes required.

1. Aims, objectives and content

Factor	Implication for repackaging
a) Suitability of purpose	A package produced for a particular group of learners in a particular educational setting may not be appropriate for different types of learners in different settings. This would make it essential to repackage the material.
b) Suitability of aims	Educational aims reflect the goals and culture of a particular society. Aims prescribed for one system may not be suitable for another. Changes in aim however, effect all aspects of a package and would require major alterations to all items.
c) Relevance of objectives	Objectives can be defined generally or specifically but must focus on precise educational outcomes. If the objectives of a package are not sufficiently specific or relevant for the needs of a local programme, they must be revised. This in turn would involve major amendments to all items of the package.
d) Promotion of active learning	Some packages have items that demand only passive looking and listening. They should be redeveloped to encourage a greater degree of participation and activity on the part of the learners.

Factor	Implication for repackaging
e) Relevance of content to syllabus	Irrelevant subject matter is easier to ...end in a textbook than in a multi-...ia package. Nevertheless content ...veyed by media such as slides and ...io programmes also must be altered ...fit local programmes.
f) Potential for updating subject matter reflecting new developments	... subject areas such as certain ...hes of science; computing; and social studies change rapidly. Decisions have to be made whether or not re-packaging is worthwhile for a complex resource which has a very limited period of usefulness.
g) Potential for adaptation for different levels	Multi-media packages frequently contain visual and other materials that can be used for quite different levels of the educational system provided accompanying descriptive and instructional materials are appropriately modified. In some instances, therefore, one package can be repackaged for quite different levels.
h) Potential for local, regional adaptation	Repackaging in response to local and regional needs sometimes may be achieved by making only minor amendments to a few items of a multi-media package. Regional and local editions of such packages greatly increase their usefulness.
i) Potential as a model for teachers to produce local packages	Well organized repackaged multi-media materials can serve as a useful model for teachers to produce similar (if simpler) resources of their own. A pamphlet giving guidelines on procedure could be produced to assist teachers in this work.

2. Media factors

Factor	Implications for repackaging
a) Range of media in the package	Variety of media is important to increase interest and enhance learning. Packages with only one or two media, say just printed materials and an audio-taped programme, may need to have other media added such as study prints or slides. Conversely some packages are over elaborate containing too many items, and may have to be rationalized in the interest of cost.
b) Suitability of the media for the messages they convey	Some media used in a package may be inappropriate for the messages to be conveyed. They would need to be converted to other types of media. Also amendments to content may make the original media inappropriate so they would need to be converted to other formats.
c) Flexibility of use of items in the package	Some packages are so organized that each part totally depends on each other part. Such packages are inflexible. They may need to be redeveloped to allow for a greater opportunity to use some or all parts separately for other topics and/or areas of the curriculum.
d) Possibility of media substitution	Some packages have media that can be easily replaced by others without major loss of educational significance. These packages are more suitable for repackaging than those containing highly specialized media such as computer discs or complex models.

Factor	Implications for repackaging
e) Extent to which certain items or parts are to be "used up"	Some items in certain multi-media packages are designed to be used up by the learners. Examples include workbooks to be "written in" by the learners, chemicals, or raw materials for making models or other products. In some cases it may be more economical to modify the package by merely suggesting sources of supply.
f) Extent to which the "container" of the package may have multiple uses	The actual package container can sometimes be used as an effective resource - especially in situations where resources are in short supply. For example the "compartments" of the storage box may be used as a sorting tray or the box could perhaps become part of a display or "stand". If these "bonuses" can be gained by minor repackaging they should not be overlooked.

3. Production considerations

Factor	Implications for repackaging
a) Availability of necessary technical skills	A repackaging exercise may envisages developing certain items for which a high degree of competence in technical skills is needed. These could include complex artwork; photography or movie production. It has to be made sure that such skills are available. Otherwise a simpler approach must be adopted.
b) Availability of materials and physical facilities	Certain repackaging situations may demand physical facilities like studios for recording and dark rooms for photography and also various materials like appropriate paper and film. Plans for repackaging need to take this into account.

Factor	Implications for repackaging
c) Cost and cost effectiveness	It has to be determined whether the money that has to be spent on re-packaging is worthwhile in terms of the number of people it will serve.
d) Ease of replacing lost or damaged item	Components of a package should be such that they could be easily replaced when damaged or lost. So care must be taken to identify for inclusion readily available and cheaper but durable materials.
e) Potential for adaptation for different groups	A degree of multiple use must be in built into components of a package e.g. the box that contains the package may serve also as a display board or the slides may be suitable for a variety of topics.

4. Utilization

Factor	Implications for repackaging
a) Ease of handling and management	Proper storage of educational materials and equipment in schools has been a problem in most countries of Asia. Proper inventories of such articles, together with repackaging using simpler and more convenient formats would help with effective maintenance, storage and handling.
b) Availability of resources in the schools to make the package effective	In certain rural countries, electricity is not always available. Repackaging could lead to similar learning outcomes by providing simpler non electronic alternatives in the package. Some schools lack audio-visual equipment. The use of simpler resources such as flash-cards or study prints could overcome this problem.

Factor	Implications for repackaging
c) Simplicity of use by all types of teachers	Some packages are not initially designed to upgrade the competency of teachers. Moreover, they may be very complicated. Repackaging of such kits would simplify their use for different purposes by all types of teachers.
d) Clarity of the teachers' guide	Some teachers' guides do not provide special instructions for all the necessary learning activities to be undertaken with the aid of the package. Some guides are written at levels inappropriate for the teachers concerned. Any amendment to any part of a package must also be reflected in the guide. Repackaging must take such factors into consideration by appropriate redevelopment of the teachers' guide.
e) Durability under different conditions of use	Some multi-media packages are packed in flimsy containers. Some have items that would wear out quickly under the proposed conditions of use. Such packages need to be redeveloped using stronger and more suitable materials.
f) Potential for updating teachers' knowledge and skills	It should be mandatory for teachers to update their knowledge and skills to meet the changing needs of their educational system. Repackaging may sometimes be undertaken expressly for this purpose.
g) Ease of mass production	In most Asian countries, there are media production centres such as national educational equipment centres. Use of such centres would help in the development of trial editions of new materials and in the mass production of the final editions of the repackaged materials.

Factor	Implications for repackaging
h) Extent of mass production	Some packages lend themselves to mass production more readily than others. Very complicated packages would need to be considerably modified if very large numbers are to be produced and distributed.

5. Distribution, trialling and evaluation

Factor	Implications for repackaging
a) Ease of distribution	Before a package is repackaged it is necessary to determine the constraints on distribution. A heavy or bulky package may cause many logistic problems. In terms of the needs identified, reorganization a few essential components of a complex package may suffice instead of redeveloping the entire package.
b) Potential for transferability from one region to another	Regional differences within a country in terms of educational needs is a reality in most countries. Hence the need for a package to contain items which facilitate easy transferability to new situations with only minor adjustments is essential.
c) Relevance of research data on the package	Frequently multi-media packages have been extensively trialled and evaluated in the educational system in which they were originally developed. This information is usually available from the producers and should be carefully assessed in terms of local conditions and needs. Frequently such information gives vital clues about changes that may need to be made to suit local conditions.

Chapter III

THE PROCESS OF REPACKAGING

A consideration of various factors which determine the suitability of a multi-media package, such as the factors described and discussed in chapter II, may lead to a decision to repackage.

The guidelines given below describe the process of repackaging. The following steps are involved:

a) diagnosis of changes to be made

b) specifying changes to be made

c) development of production plan

d) development of the modified package

A diagram showing the relationships between these steps is shown in Figure 3.

A. Diagnosis of changes to be made

In order to consider which part or parts of the package should be changed, diagnosis should be made of the suitability or effectiveness of each item in the package. A package generally consists of four major components:

1. Objectives
2. Content (scope, cultural emphasis, level of comprehension)
3. Instructional activities
4. Materials (teacher's guide, test items, learner's workbook, audio-visual media, etc.)

Diagnosis can be simply done by examining each part of the package and recording the results of the examination in a table as set out as in Table 1.

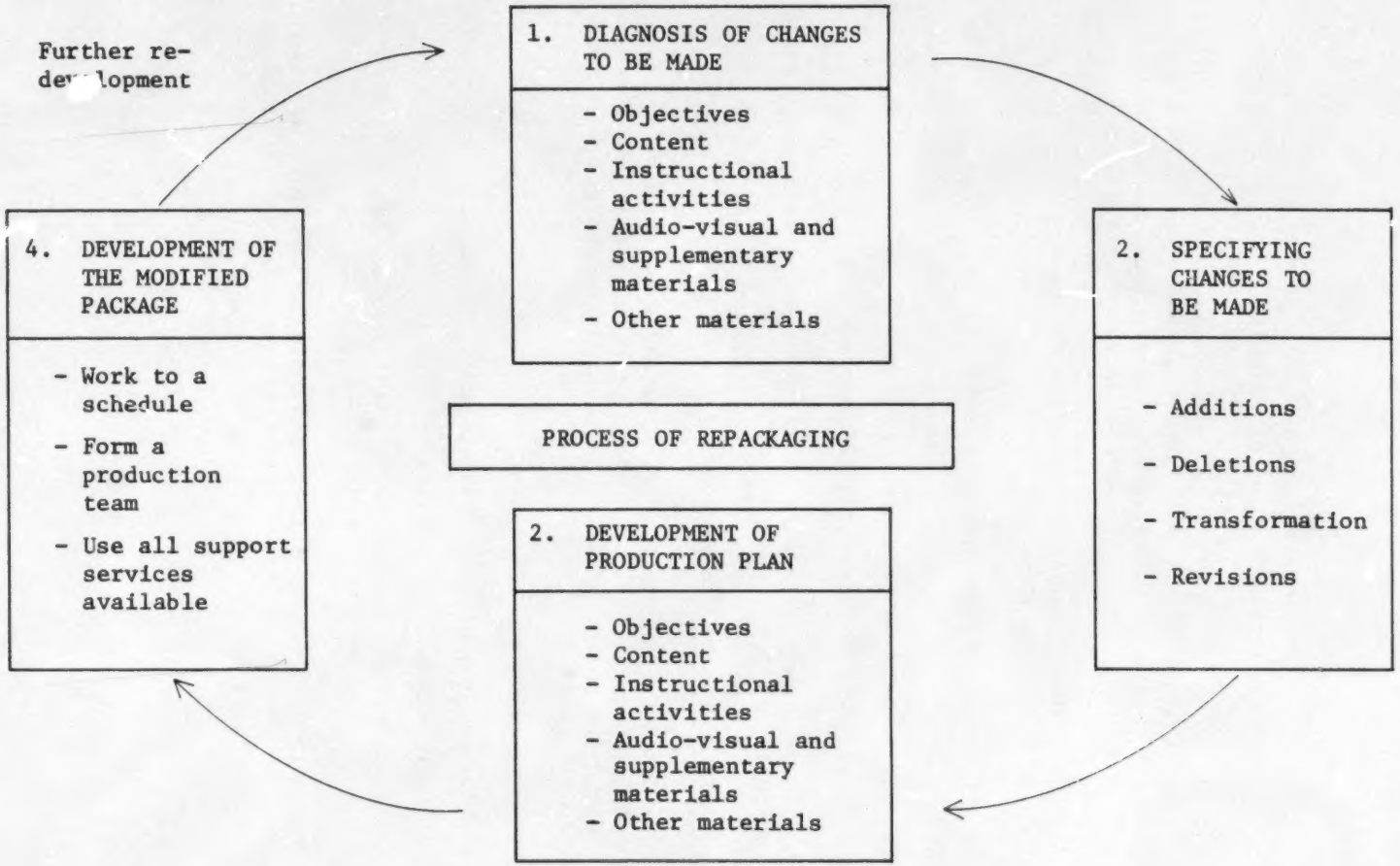

Figure 3. Steps in the process of repackaging

Table 1. Diagnosis of changes needed in a multi-media package

Item (or part) of the package	No change needed (√)	Nature of change: A=addition D=deletion T=transformation R=revision	Extent of change: ++ = major + = minor
1. Objective			
2. Content:			
Scope			
Cultural emphasis			
Level of comprehension			
3. Instructional Activities			
4. Materials:			
teacher's guide			
instructional sheets/learners' workbook			
test materials			
other printed media			
audio-visual media			
still pictures (not projected)			
still pictures (projected)			
moving pictures			
audio programmes			
still picture with sound			
moving picture with sound			
objects (models, etc.)			
5. Other materials (specify)			
6. Other items (specify)			

The first column lists the parts or items of the package.

The second column is to indicate items not needing charge. These are identified by a tick (√). The third column is to show the nature of any change to be made. These changes may be additions (A); deletions (D); transformations (T); or revisions (R). By 'transformation' is meant the conversion of one medium into another, such as an audio-taped programme into printed text. By 'revision' is meant editorial changes to an item without conversion into another medium. The fourth column records an estimate of the extent of the change, maximum (++) or minimum (+).

After completing the diagnosis the overall status of the package should be reassessed. If there are too many major changes to be made it may be more economical to develop a completely new multi-media package rather than continue with the idea of repackaging.

If, however, it is seen at this stage to be viable to proceed, the next step is to specify in more detail exactly which changes are to be made.

B. Specifying changes to be made

As indicated above changes may be additions, deletions, media transformations or revisions.

Additions are sometimes needed to ensure a closer match with the needs of the local curriculum, to utilize an additional medium to overcome a local learning difficulty, to focus attention on regional differences or for many other reasons. Deletions are frequently required to reduce cost, to make the package more relevant to local circumstances or because of problems of distribution and usage in the school system. Media transformations are usually required because of cost factors or because resources are unavailable for certain media such as video-taped programmes. Revisions are frequently required to give the material more local relevance or to change the level or style of presentation to meet local needs.

It is important, however, to recognize that a change in one part or item of a package will almost certainly necessitate changes in other parts. This is because each part of well-produced multimedia package tends to support and enhance each other part. In any event it will be essential to also change the relevant parts of the teachers guide and the learners workbook or study sheets.

A plan of action should be drawn up in the form of a specifications table. This could be drawn up as follows. Five items have been included as examples. (see Table 2)

Table 2. Specifications table for repackaging

Item	Nature of change	Reason(s) why change is to be made	Production needed
Video-taped programme	transform-ation	Video-players not generally available	Convert to slide/tape programme
Stydy Prints	transform-ation	Not attractive enough. Sound needed for the study of living things in natural habitats	Convert to slide/tape programme
Slide Set	Deletion	Unnecessary detail for level intended	-
Posters	Addition	For more meaningful communication about animal types	Artwork to be completed about animal types
Teacher Guide	Revision	To accommodate changes made in other parts of the package	Rewrite relevant sections
etc.	etc.	etc.	etc.

One of the most significant changes to be made in repackaging is the transformation of one medium into another and this process is described now in a little more detail.

While there is usually an optimal or 'best' medium to convey a particular message, it is usually possible to select from a restricted range of alternatives. A given package may have envisaged the use of certain media not readily available in all situations where the package could be used. This would necessitate some substitution. The media substitution table (table 3) is designed to function as a 'ready-reckoner' to assist in working out which media could possibly be substituted for one-another.

Table 3. Media substitution table

	Printed graphics	Board displays	Charts and posters	Study prints	35 mm slides	Strip films	OHP transparencies	8 mm/Super 8 movies	Audio-tape programmes	Real objects	Models & other simulated objects	Slide-tape programmes	Video-tape programmes	Simulation games	Printed text
Printed graphics		x	x	x	x	x				x	x		x		
Board displays	x		x	x	x		x				x				
Charts and posters	x	x		x	x		x			x	x				
Study prints	x	x	x		x	x	x			x	x	x			x
35 mm films	x	x	x	x		x	x			x	x	x	x		x
Strip films	x			x	x		x					x			
OHP transparencies	x	x	x	x	x	x				x	x			x	x
8 mm/Super 8 movies												x	x	x	
Audio-tape programmes															x
Real objects	x		x	x	x		x				x			x	
Models and other simulated objects	x	x	x	x	x		x			x			x		
Slide-tape programmes				x	x	x		x					x		x
Video-tape programmes	x				x			x				x		x	x
Simulation games							x	x		x	x		x		
Printed text				x	x		x		x			x	x		

The table is simply a correlation chart. Each 'cell' on the chart shows the relationship between two media. For example the cell row 4 column 6 shows the relationship between study prints and strip films. Where a cross occurs the two media are reasonably compatible and could be inter-converted. Where no cross exists conversion would be impracticable or educationally ineffective.

Media transformations or conversions are usually the most important and significant of the changes to be made in any multi-media package. Two simple examples are mentioned to stress this point. If certain media need electricity and electricity is not available in all schools these media must be replaced. Media requiring expensive hardware (such as projectors) could not be supplied to all schools and would need to be replaced by media requiring simpler and less expensive resources.

Situations like these may render on otherwise excellent multi-media package whose development may have cost enormous amounts of money and work, completely ineffective. This underpins the importance of how an element of adaptability with the potential for substitution should be built into such packages.

It is nevertheless very important to substitute one medium for another with great care. The media substitution table should be used only as a rough guide and with the following points firmly in mind.

Firstly it is most desirable to choose a substitution medium which can perform a given instructional task equally well as the one it replaces, e.g. a video-taped programme in place of an 8 mm sound motion picture.

Secondly we may also find that certain media used as substitutes for others could lead to a deficiency in learning due to the absence of some vital component such as movement, clear visuals, sound, a critical combination of vision and sound and so on.

Thirdly substitution can lead to excessive reliance on printed texts, lack of provision for direct participation by learners and so on - the very qualities which make multi-media packages so effective. Repackaging must not destroy the multi-media idea. One must decide if it is possible to sacrifice some features while still maintaining the learning at the highest possible level. For example, when a slide-tape programme is used to substitute for an 8 mm sound motion picture or a video-taped programme, we lose the 'movement' component. If the slide-tape programme must be used, we must in some way supplement its use by adding certain aids or suggestions to compensate for the movement which the slide-tape programme cannot show. Perhaps simple models could be provided or instructions given to observe certain natural phenomena in the classroom or in the school grounds.

C. Development of production plan

The next step in the process of repackaging is to develop a production plan.

Each item to be changed should be listed and procedures to be followed for its redevelopment should be described.

The following table (table 4) gives a few hints on the production of the modified items.

Table 4. Production hints for repackaging

Item	Production hints
Objectives	Some objectives may need to be added, some deleted and some modified. Make sure all are expressed in clear terms using behavioural language i.e. stressing what the learner should be able to do after studying the materials in the package. Make sure all objectives are relevant to the curriculum and suitable for the learners for whom the package is intended.
Content	Make sure all new content is really needed for the achievement of the objectives. Check whether all concepts are treated at the appropriate level. Make sure that a change of content in one part of the package is reflected in all other parts.
Instructional Activities	The new instructional activities should be suitable for the types of pupils for whom they are intended. Maximum use should be made of all the resources of the package.
Teachers' Guide	All changes made in any part of a multi-media packet must be reflected by corresponding changes in the Teachers' Guide. The guide should give a variety of ideas and suggestions to extend the usefulness of the package, giving it maximum flexibility.
Instructional Sheets/Learners Workbook	Probably the most important point to observe here is level of difficulty and general appropriateness of the new materials. Full use should be made of all items in the multi-media kit as the basis for instruction.

Item	Production hints
Test Materials	Special care should be taken to amend any aspects of test items that may have been directly or indirectly affected by changes in any other part of the package.
Other Printed Media	All printed media should be in simple but durable formats - on cards or sheets or in bound booklets. The style of the text should be simple and direct.
Audio-visual Materials	All audio-visual elements should complement all other parts of the package. Great care should be taken to ensure that combinations of the various media enhance learning. Certain combinations such as unmatched sounds and pictures, cause interference. Care should be taken to select the medium most appropriate for the message it conveys.
Other Materials	If additional materials are added great care should be taken to ensure their complete integration with all other parts of the package.

The production plan should list all items to be changed, should specify the nature of the change and describe in some detail exactly what has to be done. A few examples are given in table 5.

Table 5. Repackaging production plan

Item	Change to be made	Production
Slide with sound	Transformation to another medium	A set of pictures and a handbook to be produced, but picture size should be large enough for showing to a class of 45-50 primary students. Handbook to be simplified so that it can be easily used by all teachers. Emphasis to be on local examples.

Item	Change to be made	Production
Real objects and tests	Addition	Some examples of real objects known to all children to be provided in the kit. A test on local objects easily found in the school surrounding also to be added.
Teachers' guide	Revision	Explanations of all topics to be simplified with more illustrations. Examples provided to be as close to student's real-life situation as possible. Exercises be given at the end of each chapter.
etc.	etc.	etc.

D. Development of the modified package

After the changes to be made have been diagnosed and specified and a production plan devised the modified package can then be developed and produced in a form suitable for initial trialling and evaluation.

The procedure for the redevelopment of each specific item or part are the same as for any other educational resource, except that each modified item must be designed and produced as part of an integrated complementary system. The relationships between each modified part and all other parts of the package must be carefully considered. Change in one item almost always necessitates changes in almost all if not all other items in the package.

An important point about production is the need to work as a team. Audio-visual experts; classroom teachers; curriculum designers and content experts should come together to form a production team.

Production will be more efficient and effective if support is available from curriculum and resource development units; from agencies such as universities and teachers' colleges and from relevant community groups.

Production should follow a carefully programmed schedule of steps with a clearly defined target dates for producing the trial edition.

Chapter IV

TRY-OUT, EVALUATION AND RENEWAL OF REPACKAGED MATERIAL

A. Trial with small sample

The prototype multi-media package composed perhaps of written, audio-visual materials and real objects, developed on the basis of information received from different policy and information sources, learners' background, job analysis and performance analysis, topic study, etc., must be tried out with a representative sample of learners before it is produced for general use. The try-out is generally conducted to judge the accuracy and validity of the subject matter, appropriateness and acceptance of the media used, acceptance of colour, layout and art work, and to examine the reliability, objectivity, and validity of the testing instruments. But the ultimate objective of the try-out is to provide feedback on how effectively the material produced, is being understood by the target audience, and detect or discover faults and defects. The aim is to enhance learning through improving the communicability and acceptability of the material. Depending upon the nature of media, different procedures are followed for pre-testing. In case of written material, the pre-testing is done in the following distinct ways:

1. Simple reading. Each member of the sample group of learners is asked to read the text aloud which often indicates words, concepts and/or sentences which are not easily understood by the reader. The person conducting the test marks any words, concepts and sentences which were too difficult.

2. Reading with comprehension. The members of the sample group are given the text and are requested to return as soon as they finish reading. They are then given a structured test, the result of which indicates the degree to which the participants understood the text.

3. Reading followed by discussion. Under this procedure, the sample group is asked to read the text and then discuss the topic in a joint-meeting. This discussion can be recorded preferably on an audio-tape to examine the extent to which the subject matter has been understood and what deficiencies, if any, still exist in the text.

All these three methods provide meaningful feedback and should thus be applied in the try-out phase of the same text. They can be successfully applied to all elements of a multi-media package which involve the printed word.

Visual perception test

In a multi-media package, the written text is often supplemented with visuals such as printed graphics, diagrams, still pictures or study prints to clarify the written concepts. But the interpretation of visuals seems to have some association with the socio-cultural and educational background of the learners. It would, therefore, be appropriate to conduct visual perception tests to make sure that the visuals used in the packaged material communicate the same idea to the reader as the writer intended. This is especially important in the Asian region firstly because some of the material developers have received training from abroad and use illustrations which are foreign to the audience and thus are likely to be misunderstood. Secondly, the majority of our people, in both formal and non-formal education sectors, are not much exposed to this medium and may be relatively slow to absorb information presented visually.

The try-out of draft prototype material produced for use in radio (or audio-tape), television, and audio-visual programmes such as slide-tapes, are played to the sample group to obtain their reactions about such qualities as suitability of the theme, content, speaker's voice, method and time for presentation. The responses of the learners are either recorded in a questionnaire/check sheet or on a tape which is reviewed later on. Necessary amendments are made to the materials before the package is given final shape. In the case of a film, filmstrip, slides, video-tapes, or similar media, the trial is more difficult as re-testing can only be possible after completion of the production of the entire film, slide set or video-taped programme. Changes in the contents, methods of presentation and art work in a movie film would, for example, mean preparing the film from the beginning again which is an extremely expensive exercise. However to ensure accuracy, validity and acceptance of the material by the teachers and learners, all material should be tried out even if it adds to the production cost of the package. In the case of expensive materials such as films evaluation should accompany production. For example, all aspects of the shooting script should be critically evaluated before filming begins.

B. Redevelopment of the package

The results of the try-out are tabulated and analyzed to form the basis for taking decisions about the adoption and/or modification or further redevelopment of the multi-media package. This exercise should preferably be undertaken by the entire team which participated in the development of the first draft of the repackaged material.

C. Implementation

The prototype multi-media package developed after trial is generally produced in multiple copies and distributed to all relevant teachers and field workers for use in classes or other educational activities and programmes. In certain programmes, attempts are made to hold orientation workshops and seminars, for key trainers and administrators to demonstrate the feasibility and desirability of using the package. However, the basic objective of providing necessary skills in the use of the package to the ultimate users of the package may not be followed with sufficient care which results in distributing the package among teachers/ field workers who are not properly trained to use it. This oversight or careless planning to ensure training of the teachers/field workers adversely affects the outcome of the package. It is, therefore, necessary to lay down an implementation plan covering besides other elements, clearly defined activities and provision of resources for the training of personnel in the use of the package.

D. Formative evaluation and local adaptation

The multi-media development process has a built in component of evaluation which helps to develop a feedback mechanism and thus establish two-way communication between the script writers, media developers and the intended teachers. The process of try-out and evaluation is summarized in Figure 4.

The diagram shows that evaluation does not end with the development of a prototype package but instead continues throughout the programme implementation and thereafter. The kind of evaluation conducted during the implementation phase is generally known as formative evaluation and mainly focuses on the identification of the strengths and weaknesses of various components of the multi-media package with special reference to design, format, art work, accuracy of subject matter, acceptance and preference of media, personnel training, teaching-learning processes and media management. This is done with the help of different instruments such as questionnaires,

opinioners, checklists, interviews, case studies, and so on. Formative evaluation also suggests ways and means of improving various components of the package by maximizing their strengths and reducing weaknesses through the use of appropriate alternatives. The results of this exercise thus helps to repackage or re-design the package to meet the needs of various types of learners and local socio-cultural, and economic situations.

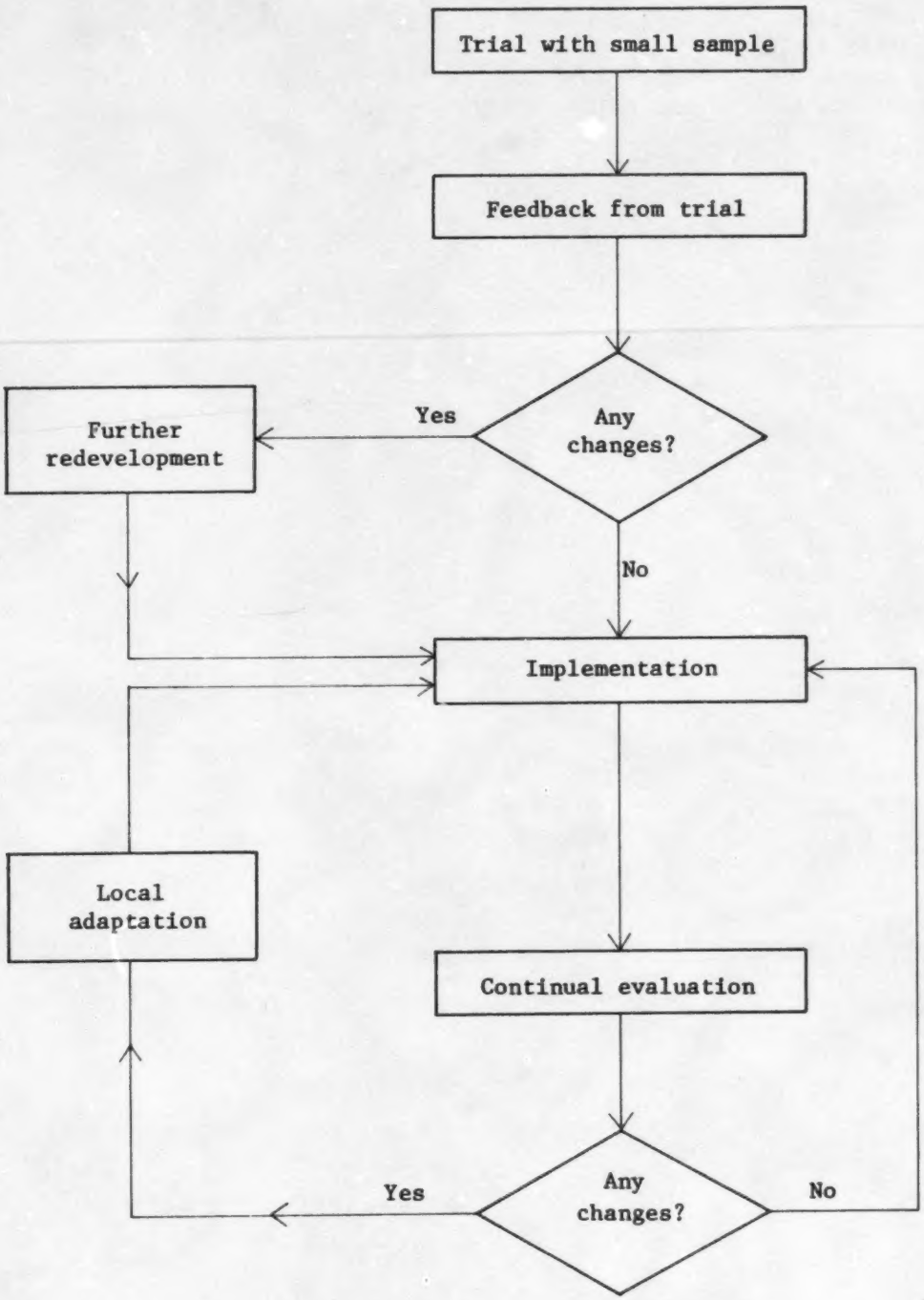

Figure 4. The process of try-out and evaluation